

(19) 世界知的所有権機関  
国際事務局(43) 国際公開日  
2005 年 9 月 22 日 (22.09.2005)

PCT

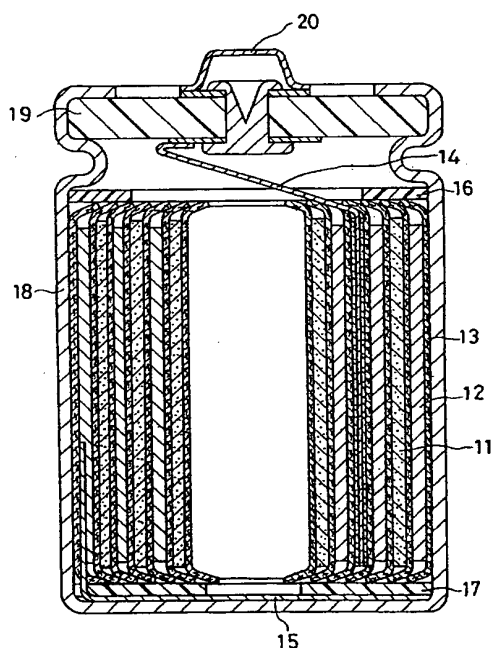
(10) 国際公開番号  
WO 2005/088761 A1

- (51) 国際特許分類: H01M 10/40, 4/02, 4/38, 4/58 (74) 代理人: 石井和郎, 外(ISHII, Kazuo et al.); 〒5410041 大阪府大阪市中央区北浜 2 丁目 3 番 6 号 北浜山本ビル Osaka (JP).
- (21) 国際出願番号: PCT/JP2005/004443
- (22) 国際出願日: 2005 年 3 月 14 日 (14.03.2005) (81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (25) 国際出願の言語: 日本語
- (26) 国際公開の言語: 日本語
- (30) 優先権データ: 特願2004-074254 2004 年 3 月 16 日 (16.03.2004) JP
- (71) 出願人 (米国を除く全ての指定国について): 松下電器産業株式会社 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) [JP/JP]; 〒5718501 大阪府門真市大字門真 1 0 0 6 番地 Osaka (JP).
- (72) 発明者: および
- (75) 発明者/出願人 (米国についてのみ): 武澤 秀治 (TAKEZAWA, Hideharu).
- (84) 指定国 (表示のない限り、全ての種類の広域保護が可能): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), ユーラシア (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), ヨーロッパ (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR),

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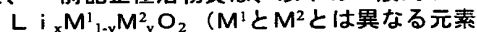
(54) Title: LITHIUM SECONDARY BATTERY

(54) 発明の名称: リチウム二次電池



(57) Abstract: A lithium secondary battery comprising a positive electrode containing a positive electrode active material, a negative electrode containing a negative electrode active material and a nonaqueous electrolyte, wherein the positive electrode active material contains at least one lithium-containing composite oxide of the general formula:  $\text{Li}_x\text{M}^1_{1-y}\text{M}^2_y\text{O}_2$  (in which  $\text{M}^1$  and  $\text{M}^2$  represent different elements;  $\text{M}^1$  is Ni or Co;  $\text{M}^2$  is at least one member selected from among Ni, Co, Mn, Mg and Al;  $1 \leq x \leq 1.05$ ; and  $0 \leq y \leq 0.7$ ), wherein the negative electrode active material contains at least one member selected from the group consisting of silicon, tin, silicon-containing alloys and tin-containing alloys, and wherein an organic peroxide is contained in at least one of the positive electrode, negative electrode and nonaqueous electrolyte. An increase of battery capacity can be attained by this combination of positive electrode and negative electrode, and cycle characteristics can be enhanced by the containing of organic peroxide in at least one of the positive electrode, negative electrode and nonaqueous electrolyte.

(57) 要約: 正極活物質を含む正極、負極活物質を含む負極、および非水電解液を備え、前記正極活物質は、以下の一般式:



であり、 $\text{M}^1$  は Ni または Co であり、 $\text{M}^2$  は Ni、Co、Mn、Mg および Al から選ばれる少なくとも 1 種であり、 $1 \leq x \leq 1.05$ 、 $0 \leq y \leq 0.7$  で表される少なくとも 1 種のリチウム含有複合酸化物を含み、負極活物質は、シリコン、スズ、シリコン含有合金およびスズ含有合金よりなる群から選ばれる少なくとも 1 種に、有機過酸化物が含有されているリチウム

二次電池。前記のような正極および負極の組み合わせを用いることにより、電池容量を向上させることができると共に、正極、負極および非水電解液の少なくとも 1 つが、有機過酸化物を含むことにより、サイクル特性を向上させることができる。

WO 2005/088761 A1

## PATENT COOPERATION TREATY

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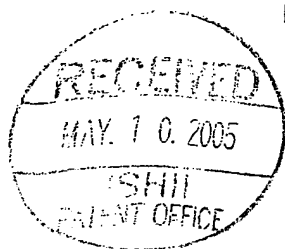
From the INTERNATIONAL BUREAU

To:

ISHII, Kazuo  
 Kitahama-Yamamoto Building  
 3-6, Kitahama 2-chome, Chuo-ku  
 Osaka-shi, Osaka 541-0041  
 Japan

NOTIFICATION OF RECEIPT OF  
RECORD COPY

(PCT Rule 24.2(a))



<b>Date of mailing (day/month/year)</b> 29 April 2005 (29.04.2005)	<b>IMPORTANT NOTIFICATION</b>
<b>Applicant's or agent's file reference</b> P38093-P0	<b>International application No.</b> PCT/JP2005/004443

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

Matsushita Electric Industrial Co., Ltd. (for all designated States except US)  
 TAKEZAWA, Hideharu (for US)

International filing date : 14 March 2005 (14.03.2005)

Priority date(s) claimed : 16 March 2004 (16.03.2004)

Date of receipt of the record copy  
by the International Bureau : 24 March 2005 (24.03.2005)

List of designated Offices :

AP : BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW

EA : AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

EP : AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR

OA : BF, BJ, CF, CG, CI, CM, GA, GN, GO, GW, ML, MR, NE, SN, TD, TG

National : AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

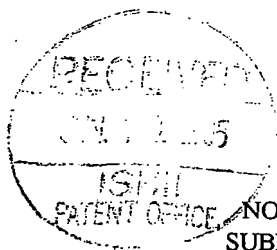
The International Bureau of WIPO  
 34, chemin des Colombettes  
 1211 Geneva 20, Switzerland

Facsimile No. (41-22) 338.90.90

Authorized officer:

Mitsuyo IWAMOTO (Fax 338 9090)

Telephone No. (41-22) 338 8723



PCT

NOTIFICATION CONCERNING  
SUBMISSION OR TRANSMITTAL  
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

From the INTERNATIONAL BUREAU

To:

ISHII, Kazuo  
Kitahama-Yamamoto Building  
3-6, Kitahama 2-chome, Chuo-ku  
Osaka-shi, Osaka 541-0041  
JAPON

Date of mailing (day/month/year) 28 May 2005 (28.05.2005)	
Applicant's or agent's file reference P38093-P0	IMPORTANT NOTIFICATION
International application No. PCT/JP05/004443	International filing date (day/month/year) 14 March 2005 (14.03.2005)
International publication date (day/month/year)	Priority date (day/month/year) 16 March 2004 (16.03.2004)
Applicant Matsushita Electric Industrial Co., Ltd. et al	

- By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
- (If applicable)* The letters "NR" appearing in the right-hand column denote a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
- (If applicable)* An asterisk (\*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b) (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
16 March 2004 (16.03.2004)	2004-074254	JP	12 May 2005 (12.05.2005)

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Akremi Taieb

Facsimile No. +41 22 740 14 35

Facsimile No. +41 22 338 90 90  
Telephone No. +41 22 338 9415

# PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

# PCT

FIRST NOTICE INFORMING THE APPLICANT OF  
THE COMMUNICATION OF THE INTERNATIONAL  
APPLICATION (TO DESIGNATED OFFICES WHICH  
DO NOT APPLY THE 30 MONTH TIME LIMIT  
UNDER ARTICLE 22(1))

(PCT Rule 47.1(c))

To:

ISHII, Kazuo  
Kitahama-Yamamoto Building  
3-6, Kitahama 2-chome, Chuo-ku  
Osaka-shi, Osaka 541-0041  
JAPON



Date of mailing (day/month/year)  
20 October 2005 (20.10.2005)

Applicant's or agent's file reference  
P38093-P0

## IMPORTANT NOTICE

International application No.  
PCT/JP2005/004443

International filing date (day/month/year)  
14 March 2005 (14.03.2005)

Priority date (day/month/year)  
16 March 2004 (16.03.2004)

Applicant

Matsushita Electric Industrial Co., Ltd. et al

1. **ATTENTION:** For any designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002 (30 months from the priority date), **does apply**, please see Form PCT/IB/308(Second and Supplementary Notice) (to be issued promptly after the expiration of 28 months from the priority date).

2. Notice is hereby given that the following designated Office(s), for which the time limit under Article 22(1), as in force from 1 April 2002, **does not apply**, has/have requested that the communication of the international application, as provided for in Article 20, be effected under Rule 93bis.1. The International Bureau has effected that communication on the date indicated below:  
22 September 2005 (22.09.2005)

CH

In accordance with Rule 47.1(c-bis)(i), those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

3. The following designated Offices, for which the time limit under Article 22(1), as in force from 1 April 2002, **does not apply**, have not requested, as at the time of mailing of the present notice, that the communication of the international application be effected under Rule 93bis.1:

LU, SE, TZ, UG, ZM

In accordance with Rule 47.1(c-bis)(ii), those Offices accept the present notice as conclusive evidence that the Contracting State for which that Office acts as a designated Office does not require the furnishing, under Article 22, by the applicant of a copy of the international application.

### 4. TIME LIMITS for entry into the national phase

For the designated Office(s) listed above, and unless a demand for international preliminary examination has been filed before the expiration of **19 months** from the priority date (see Article 39(1)), the applicable time limit for entering the national phase will, **subject to what is said in the following paragraph**, be **20 MONTHS** from the priority date.

In practice, **time limits other than the 20-month time limit** will continue to apply, for various periods of time, in respect of certain of the designated Offices listed above. For **regular updates on the applicable time limits** (20 or 21 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

It is the applicant's **sole responsibility** to monitor all these time limits.

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Yoshiko Kuwahara

Facsimile No.+41 22 740 14 35

Facsimile No.+41 22 338 90 90

From the INTERNATIONAL BUREAU

**PCT**INFORMATION CONCERNING ELECTED  
OFFICES NOTIFIED OF THEIR ELECTION

(PCT Article 31(7) and Rule 61.3)

To:

ISHII, Kazuo  
Kitahama-Yamamoto Building  
3-6, Kitahama 2-chome, Chuo-ku  
Osaka-shi, Osaka 541-0041  
JAPON



Date of mailing (day/month/year) 13 October 2005 (13.10.2005)		
Applicant's or agent's file reference P38093-P0		<b>IMPORTANT INFORMATION</b>
International application No. PCT/JP2005/004443	International filing date (day/month/year) 14 March 2005 (14.03.2005)	
		Priority date (day/month/year) 16 March 2004 (16.03.2004)
Applicant Matsushita Electric Industrial Co., Ltd. et al		

- The applicant is hereby informed that the International Bureau has, according to Article 31(7), notified each of the following Offices of its election:  
**EP:** AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR  
**National:** BG, CA, CN, CZ, DE, JP, KP, KR, MN, NO, PL, RO, RU, SK, SM, US
- The following Offices have waived the requirement for the notification of their election; the notification will be sent to them by the International Bureau only upon their request:  
**AP:** BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW  
**EA:** AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
**OA:** BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG  
**National:** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BR, BW, BY, BZ, CH, CO, CR, CU, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MW, MX, MZ, NA, NI, NZ, OM, PG, PH, PT, SC, SD, SE, SG, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW
- Since the election(s) was (were) made before the expiration of 19 months from the priority date, the applicant is reminded that he must enter the "national phase" **before the expiration of 30 months from the priority date** before each of the Offices listed above. This must be done by paying the national fee(s) and furnishing, if prescribed, a translation of the international application (Article 39(1)(a)), as well as, where applicable, by furnishing a translation of any annexes of the international preliminary report on patentability (Chapter II of the Patent Cooperation Treaty) (Article 36(3)(b) and Rule 74.1).  
  
 Some Offices have fixed time limits expiring later than the above-mentioned time limit. See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters, the *PCT Newsletter* and the WIPO Internet site, updated regularly.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  Yoshiko Kuwahara
Facsimile No.+41 22 740 14 35	Facsimile No.+41 22 338 90 90